CORRECTED SURREBUTTAL TESTIMONY OF KENNETH SERCY
ON BEHALF OF THE SOUTHERN ALLIANCE FOR CLEAN ENERGY AND SOUTH CAROLINA COASTAL CONSERVATION LEAGUE
DOCKET NO. 2021-88-E

Q. PLEASE STATE YOUR NAME, OCCUPATION, AND BUSINESS ADDRESS.

A. My name is Kenneth Sercy. I am an independent electric sector consultant, and my business address is 9042 East 24th Place #102, Denver CO 80238.

Q. ON WHOSE BEHALF ARE YOU PROVIDING TESTIMONY?

A. I am providing testimony on behalf of the South Carolina Coastal Conservation League ("CCL") and the Southern Alliance for Clean Energy ("SACE").

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to respond to the rebuttal testimony of Dominion Energy South Carolina ("DESC") witnesses James Neely, Eric Bell, and Daniel Kassis.

Q. HOW IS YOUR TESTIMONY ORGANIZED?

A. My testimony is organized as follows:

I. Avoided Energy Rates

II. Avoided Capacity Rates

III. Transparency in DESC's Application and Testimony

IV. Conclusions and Recommendations

I. AVOIDED ENERGY RATES

a. Natural Gas Forecast

Q. DO YOU AGREE WITH WITNESS NEELY'S ASSERTION THAT DESC SHOULD USE A DIFFERENT NATURAL GAS PRICE FORECAST FOR CALCULATING AVOIDED COSTS THAN WAS USED FOR DEVELOPING THE COMPANY'S IRP?

A. No. As I stated in my direct testimony, DESC will not experience different natural gas prices in the context of avoided costs than it will in the context of integrated resource planning ("IRP"), and the same Commission-approved methodology should be used consistently across these dockets. Witness Neely states that "for calculating avoided costs, it is necessary to derive the most accurate projection that can be ascertained at the time the costs are calculated."[1] While this is true, his conclusion—that avoided cost calculations require a different set of assumptions than an IRP—is illogical and unsupported. It is vital for DESC to use the most accurate natural gas price forecasts available when developing *both* its IRP and avoided cost rates.

Q. WITNESS NEELY RESPONDED TO YOUR RECOMMENDATION THAT DESC USE A BLENDED FORECAST TO RECALCULATE ITS AVOIDED ENERGY RATES.[2] WHY IS A BLENDED FORECAST SUPERIOR TO DESC's CURRENT GAS PRICE FORECAST?

A. In short, the blended approach I recommend is more reliable as a means of calculating avoided energy costs when compared with DESC's methodology. As Witness Neely notes, the Energy Information Administration ("EIA") Annual Energy Outlook ("AEO") forecast consists of multiple forecasts, including a reference case. DESC used the EIA AEO reference case forecast to derive its escalation rate, but not to directly calculate

[1] Rebuttal Testimony of James Neely at 5, Docket No. 2021-88-E (Aug. 10, 2021).
[2] *Id.* at 7.

avoided costs, instead applying the escalation rate to current NYMEX prices. Witness Neely claims that the EIA AEO is not appropriate for avoided cost calculations because it "does not provide a single forecast and instead provides a broad and wide range of how prices might develop."[3] I disagree with Witness Neely's conclusion. While the AEO as a whole does provide a broad and wide range of how prices might develop, the reference case is a reasonable price benchmark to use for avoided cost calculations. Further, for several reasons, the EIA AEO reference case is an appropriate natural gas forecast to use *directly* for avoided cost calculations, as part of the blended approach that I recommend, and not only for the escalation rate.

First, the EIA AEO reference case accounts for persistent supply and demand factors that actually drive long-term prices, resulting in a more reliable forecast for avoided cost purposes. In contrast, DESC's application of the AEO reference case escalation rate to current NYMEX prices has the effect of carrying short-term price effects through the entire long-term forecast, inappropriately overemphasizing those short-term effects and producing an unreliable forecast. For example, under DESC's methodology, a three-month downward fluctuation in gas prices due to unseasonably mild weather could substantially impact forecasted prices in year ten, which is unrealistic and inaccurate. Contrary to Witness Neely's suggestion, DESC's approach reduces the accuracy of the Company's avoided cost calculations compared with the blended approach I recommend.

Second, my recommendation of using a blended forecast more appropriately balances short-term futures market indicators and long-term gas supply and demand dynamics. Witness Neely claims that DESC's approach better represents expected gas

[3] *Id.* at 5.

prices because "market characteristics may have changed between the time [the EAI AEO] projections were made and the calculation of DESC's avoided costs."[4] However, under the blended approach I recommend, the initial years of the blended forecast capture current NYMEX market data as appropriate to reflect any short-term pricing changes that may arise after the annual publication of the AEO. Thus, contrary to Witness Neely's claim, a blended approach ensures that short-term changes are captured, while also more accurately forecasting long-term trends compared with DESC's current approach. It is also important to note that major long-term market supply and demand shifts are unlikely to occur in short timeframes, and any incremental changes that do occur will be captured when avoided cost calculations are reset biannually as required by Act 62.

b. Load Forecast

Q. PLEASE RESPOND TO WITNESS NEELY'S REBUTTAL TESTIMONY ON THE LOAD FORECAST USED IN THE AVOIDED COST CALCULATIONS.

A. It appears that DESC's 2020 Modified IRP load forecast did not include demand-side management ("DSM") savings, while those savings were included in the load forecast DESC used to calculate its proposed avoided cost rates. I recommend that in future filings, DESC provide both its gross load forecast and the specific DSM savings assumptions that modify the gross load forecast for purposes of developing avoided cost rates.

c. Pricing Periods

Q. WHAT IS YOUR RESPONSE TO DESC'S REBUTTAL TESTIMONY ON THE AVOIDED ENERGY PRICING PERIODS USED IN THE AVOIDED COST RATES.

[4] *Id.* at 6.

A. DESC Witnesses Neely and Bell claimed that DESC's pricing periods were justified by hourly marginal cost data the Company produced in discovery. However, neither addressed the central concern I identified in my direct testimony: the heat map which DESC relied upon to set its pricing periods does *not* accurately reflect the data that DESC provided. Further, neither witness provided any substantive justification for the criteria DESC used to group hours and months into pricing period "blocks"; there is substantial cost variation within several of DESC's pricing periods, which raises serious concerns about the objectivity of DESC's approach and whether the resulting pricing periods and rates accurately reflect DESC's avoided costs as required by the Energy Freedom Act.

Q. PLEASE DESCRIBE IN FURTHER DETAIL THE DISCREPANCIES YOU IDENTIFIED IN DESC'S HEAT MAP.

A. As Witness Bell acknowledged, DESC used a "heat map" tool as a starting point for developing the pricing periods it proposes in this proceeding. The heat map is supposed to display DESC's expected system marginal costs during each hour of every month, using a color spectrum where the lowest average prices are depicted by shades of dark green and the highest prices are displayed in dark red. The intent of the heat map is to look for areas with similar colors (and thus prices) to identify time periods with similar pricing characteristics that can be grouped together into pricing period "blocks" that are used to assign a price value that is paid to QFs for the energy they produce during those periods.

My direct testimony noted that, in various places, DESC's heat map displays completely different colors for essentially the same prices. Figure 1 below is a screenshot displaying DESC's Excel heat map for the hours of midnight to 9:00AM. I have added

markings and labels to point out two data points where, in one instance, the price of $33.40 is marked as light green, while in the other a *lower* price of $33.16 is indicated in dark red.

Figure 1. Discrepancies in DESC Pricing Period Heat Map (Hours 1-9)

Month	1	2	3	4	5	6	7	8	9
1	32.53	32.60	32.58	33.40	34.47	37.05	40.61	42.18	39.08
2	28.44	28.11	28.24	28.27	29.00	30.69	32.63	33.16	31.01
3	28.68	28.53	28.37	28.77	29.51	31.34	36.76	39.84	33.81
4	26.73	25.33	24.92	24.56	24.81	26.09	29.05	29.35	25.79
5	27.22	26.17	25.58	25.21	25.19	26.28	27.94	26.65	25.09
6	28.71	27.87	27.16	26.82	26.74	27.15	27.72	27.64	27.06
7	29.45	28.93	28.77	28.71	28.72	28.85	28.89	27.62	25.99
8	28.86	28.51	28.37	28.25	28.15	28.29	28.43	28.19	26.96
9	27.94	27.05	26.50	26.19	26.25	26.78	28.38	29.38	27.64
10	27.31	26.38	25.74	25.38	25.60	26.47	28.46	29.45	27.63
11	31.09	30.43	30.36	30.60	31.41	33.18	38.15	36.04	31.55
12	27.73	27.41	27.39	27.58	28.53	29.87	31.96	33.53	30.60

33.40
33.16

Figure 2 highlights another example where a price of $34.97 (in January hour 23) is displayed as yellow, while numerous lower prices nearby are displayed in orange or red. The discrepancies are not limited to these examples; there are numerous such instances across the map.

Figure 2. Discrepancies in DESC Pricing Period Heat Map (Hours 15-24)

15	16	17	18	19	20	21	22	23	24
28.89	29.28	30.09	35.37	38.07	38.49	38.37	36.99	34.97	33.62
25.61	25.81	26.38	30.16	32.45	32.81	32.55	31.50	30.41	29.14
25.13	25.53	26.32	27.95	30.82	34.14	35.08	33.46	32.09	30.96
25.43	26.43	26.52	27.45	30.88	33.33	34.26	33.37	31.59	28.91
28.50	28.75	29.08	30.46	31.42	35.30	36.42	35.52	32.72	28.96
33.04	33.95	35.19	36.18	37.06	38.01	38.07	36.85	33.09	30.31
32.43	33.92	34.29	34.29	34.20	35.72	36.12	34.02	31.70	30.10
32.62	33.72	34.64	35.17	35.79	36.14	35.36	33.12	30.72	29.41
31.01	31.50	32.16	33.56	36.01	37.65	36.31	34.69	31.45	29.46
28.24	29.21	30.61	32.68	35.82	36.64	35.12	32.73	30.03	28.02
27.02	27.21	30.91	34.99	36.00	37.88	36.46	34.82	33.23	31.72
24.51	24.74	27.84	31.56	32.62	32.49	32.22	31.45	30.02	28.45

34.97
32.45
32.81
32.55
30.88
33.33
34.26
33.37

This indicates a serious underlying flaw in the method DESC used to create the heat map; in order to be in any way useful for defining pricing periods, a 12 x 24 heat map such

as DESC used must have a consistent color scale across the entire heat map. If the color scale is inconsistent, then grouping certain hours and/or months together into one period based on similar colors is a meaningless and misleading exercise. This fundamental flaw completely discredits DESC's proposed pricing periods. Witness Bell argues that "the data in the heat maps is aligned with system costs."[5] Even if this statement is taken at face value, the problem is that the colors in the heat map are not aligned with the data.

Q. DID YOU PREPARE A VERSION OF DESC'S HEAT MAP THAT APPLIES A CONSISTENT COLORATION SCHEME?

A. Yes. Witness Bell notes in his rebuttal testimony that DESC used Excel's "conditional formatting" function in order to create the heat map. However, I believe DESC erred in using this tool. I input the exact values DESC provided into Excel and applied conditional formatting to the data set using the same coloration scheme DESC purported to use; Exhibit KS-1 displays my corrected heat map alongside DESC's flawed version for comparison.

The corrected heat map, unlike DESC's version, has a consistent coloration scheme, such that data points with similar prices are colored similarly. Also, the corrected heat map overall has fewer dark red and dark green data points. In trying to understand why the heat maps were so different from each other, I tested different applications of the conditional formatting tool to DESC's values to try and replicate DESC's coloration scheme. Through trial and error, I was able to determine that DESC appears to have erred when using Excel's conditional formatting tool to create its heat map.

[5] Rebuttal Testimony of Eric Bell at 18, Docket No. 2021-88-E (Aug. 10, 2021).

Q. WHAT ERROR DO YOU BELIEVE DESC MADE WHEN CREATING ITS HEAT MAP?

A. It appears that DESC incorrectly applied conditional formatting to each month separately, rather than to its entire data set; DESC's heat map is internally inconsistent because the Company effectively created twelve separate heat maps—one for each month of the year. As a result, the coloration scheme in DESC's heat map is only consistent if you look at one month at a time. For example, DESC's heat map shows the highest January price in bright red, with the lowest January price in dark green. But, in the corrected heat map in Exhibit KS-1, there are no "green" prices in January at all; this is because across all hours of the day, January has the highest or nearly the highest costs. DESC's flawed heat map does not account for this important seasonal observation.

Importantly, DESC's error means that colors in its heat map cannot be used to compare prices from one month to another. DESC, however, appeared to do just that, as it developed its proposed pricing periods—which extend across multiple months—by grouping similar colors together.

DESC should have applied Excel's conditional formatting tool to its entire 12x24 matrix, as I did in the corrected version; doing so creates one consistent heat map that indicates periods of high, medium, and low cost for DESC's system across all hours and months.

Q. WITNESS BELL STATES THAT DESC USED THE HEAT MAP ONLY AS A "STARTING POINT" WHEN DEVELOPING ITS PROPOSED PRICING PERIODS. DOES THIS ALLEVIATE YOUR CONCERNS ABOUT THE COMPANY'S METHODOLOGY?

A. No. Witness Bell's suggestion in rebuttal that the heat map is only a "starting point" further calls into question the soundness of DESC's pricing period methodology. Witness Bell states that the heat map was used as the first step in:

> [D]evelop[ing] groups that were adjusted in a logical manner for season and hour of day to create a practical and useable rate schedule. The values that define the rate profile were developed using the mathematical average of each group of marginal costs and are not thumb rule estimates or approximations.[6]

Witness Bell appears to misunderstand my testimony; I do not dispute that DESC's proposed prices result from averaging the values within each pricing period "box" that DESC created in its 12 x 24 heat map.[7] Rather, my concern is that the methodology DESC used to draw each pricing period block was deeply flawed, and as a result its proposed prices for each pricing period are flawed as well. There are two issues with DESC's overall methodology. First, as discussed above, DESC made a fundamental error when using the Excel conditional formatting tool to create its heat map, and the result is that the color scheme on the heat map cannot be used to group pricing periods together across multiple months.

Second, in many instances DESC's "logical" groupings do not appear to align with even their own (incorrect) color scheme. For several of DESC's proposed pricing periods—which should group similarly priced time periods together—average prices within those periods vary significantly, with some periods containing the entire color spectrum from green to red. This undermines Witness Bell's assertions that the pricing periods are aligned with system costs, and implies that DESC must have applied some subjective criteria to

[6] *Id*.
[7] While DESC ran five PLEXOS runs, the values in its 12x24 heat map appear to use data from only one of those runs; using values averaged across all five of its PLEXOS runs could result in more accurate values.

group hours and months together into pricing periods. Notably, however, neither Witness Neely nor Witness Bell provided any justification or clarification of the criteria or methodology it used to group those periods together. In sum, my critique of DESC's pricing periods is as follows: but for the errors in DESC's methodology, DESC would have—and should have—drawn different pricing period "blocks" and thus obtained different prices.

Q. DO YOU HAVE ANY RECOMMENDATIONS ON HOW TO IMPROVE THE ACCURACY OF DESC'S ENERGY PRICING PERIOD DESIGNATIONS?

A. Yes. First, DESC should be required to correct the methodology used to develop its heat map so it is internally consistent. DESC appears to be using the colors in the heat map as a starting point to group different hours into pricing periods; the apparent errors in the heat map's color scheme render all of DESC's proposed pricing periods suspect on their face. DESC should be able to correct this error simply by applying conditional formatting a single time across the entire 12 x 24 price matrix.

Second, DESC's method of grouping hours and months together into pricing periods appears to have been highly subjective (and in some instances, counterintuitive); I recommend that DESC instead use a data-driven approach to grouping hours and months into pricing periods based on the colors in the heat map. The approach I recommend involves, first, creating candidate pricing periods by visually examining the heat map for areas that are similarly colored, and grouping those hours into a pricing period. Then, descriptive statistics can be run for the price values that make up the candidate pricing periods.

Those statistics can guide the designation of pricing periods in a data-driven way. The price datasets making up the different pricing periods, for example, should have similar ranges and standard deviations, both of which are measures of variability within the pricing periods. The range and standard deviation for each pricing period should also be as small as possible, while still maintaining consistency across periods. Smaller ranges and standard deviations indicate smaller differences in prices within a given period, which is the goal of creating pricing periods.

In this manner, different potential pricing period schemes can be evaluated against one another to guide selection. Table 1 below illustrates that for DESC's proposed pricing periods, the ranges and standard deviations vary considerably and are not particularly low. For example, the standard deviation for SO1 is more than three times that of SO11, and the range for SO5 is around three times that of SO11; additionally, the range of $14.05 for SO5 means that prices in the hours making up this pricing period vary by more than $14, indicating that they are not particularly similar and perhaps should not be grouped together.

Table 1: Descriptive Statistics for DESC Pricing Periods

	Mean	Median	Std Dev	Range	Min	Max
SO1	$ 34.36	$ 32.89	$ 4.26	$ 12.31	$ 29.87	$ 42.18
SO2	$ 27.63	$ 27.22	$ 2.77	$ 10.55	$ 24.40	$ 34.95
SO3	$ 33.47	$ 32.52	$ 2.85	$ 8.47	$ 30.02	$ 38.49
SO4	$ 29.86	$ 28.49	$ 2.51	$ 7.07	$ 27.39	$ 34.47
SO5	$ 31.43	$ 30.40	$ 4.45	$ 14.05	$ 25.79	$ 39.84
SO6	$ 26.65	$ 26.37	$ 1.83	$ 7.09	$ 23.83	$ 30.91
SO7	$ 33.37	$ 33.42	$ 2.63	$ 10.43	$ 27.45	$ 37.88
SO8	$ 28.09	$ 28.45	$ 2.35	$ 7.16	$ 24.56	$ 31.72
SO9	$ 30.53	$ 30.32	$ 2.66	$ 9.60	$ 25.59	$ 35.19
SO10	$ 34.77	$ 35.33	$ 2.15	$ 7.61	$ 30.46	$ 38.07
SO11	$ 27.56	$ 27.63	$ 1.28	$ 5.22	$ 25.09	$ 30.31

Q. DO YOU HAVE ANY FINAL RECOMMENDATIONS REGARDING THE PRICING PERIODS?

A. Yes. Because I recommend re-running DESC's PLEXOS modeling with reasonable natural gas price assumptions as stated in my direct testimony, I further recommend that those revised system marginal price data be used under the methodology I propose here to re-design energy pricing periods.

d. <u>Eligibility of Standalone Solar for Technology-Neutral Energy Rate</u>

Q. HOW DO YOU RESPOND TO WITNESS NEELY'S RESPONSE TO YOUR RECOMMENDATION THAT SOLAR QFs BE ELIGIBLE FOR THE TECHNOLOGY NEUTRAL QF ENERGY RATE?

A. Witness Neely's response fails to address two key points in my direct testimony. First, Witness Neely argues that the single solar production profile used by DESC to develop the solar QF energy rates is a reasonable representation of the solar QFs likely to be proposed in the future.[8] However, as I explained in my direct testimony, QFs would be *more* accurately compensated under the time-of-use approach of the technology neutral rate; Witness Neely did not respond to this point. By definition, a rate that compensates QFs based on the specific hours they generate is better able to capture the different production profiles of individual solar QFs, compared to a rate that is based on a single production profile, even if the latter rate is based on a composite of many solar profiles. As noted in my direct testimony, energy production among solar QFs may vary due to geographic location and technology choice.

[8] Rebuttal Testimony of James Neely at 10-11, Docket No. 2021-88-E (Aug. 10, 2021).

Second, Witness Neely contends that the amount of existing solar on DESC's system today and the "system dispatch requirements" of solar mean that solar QFs should not be eligible for the technology neutral energy rate.[9] But the technology neutral rate already accounts for the existing solar on DESC's system by modeling that solar as part of both the base and change cases in the PLEXOS avoided energy cost simulations, as noted in my direct testimony. Witness Neely also does not reference the fact that DESC is proposing a variable integration charge intended to capture the impacts of solar variability, which if approved could readily be applied to any solar QFs under the technology neutral energy rates. In fact, in the 2019 avoided cost proceedings, this Commission approved just such an approach both for DESC[10] and for the Duke Energy operating companies.[11] At the time of those orders, the DESC and Duke systems already had material levels of solar installed; for example, DESC had 598 MW interconnected compared to the 300 MW that Witness Neely suggested may not have required a solar-specific energy rate.[12]

e. <u>Locational Marginal Pricing</u>

Q. WHAT IS YOUR RESPONSE TO WITNESS NEELY'S COMMENTS ON USING A LOCATIONAL MARGINAL PRICE ("LMP") SYSTEM?

A. As I described in my direct testimony, an LMP system would provide more accurate price signals across the DESC grid, and would further enable calculation of avoided costs "based on the geographic location and resource type of a small power producer's qualifying small power production facility." Those price signals would incentivize all QFs, including solar

[9] *Id.* at 11-12.
[10] Commission Order No. 2020-244 at 7-9, Docket No. 2019-184-E (Mar. 24, 2020).
[11] *See* Commission Order No. 2019-881(A) at 167-168, Docket Nos. 2019-185-E, 2019-186-E (Jan. 2, 2020), and DEC Schedule PP (SC) and DEP SC Schedule PP-5, Docket Nos. 2019-185-E, 2019-186-E (Jan. 17, 2020).
[12] Direct Testimony of Brian Horii at 36, Docket No. 2019-184-E (Sep. 23, 2019).

QFs, to identify and locate in the most beneficial areas on DESC's grid. Witness Neely claims that "the locational avoided costs under the LMP system would be lower for many solar generators" but does not provide any data on DESC's transmission system to indicate where congestion exists or what LMPs would look like in different areas on the system.[13] In any case, the advantage of an LMP system as it relates to solar QFs is that those QFs would choose to locate in the most valuable places on the grid, which would be a benefit to DESC and its customers relative to the existing pricing approach.

f. Coal Dispatch

Q. DO YOU AGREE WITH WITNESS NEELY'S STATEMENTS ABOUT MODELING THE WILLIAMS COAL PLANT AS MUST-RUN?

A. Witness Neely claims that modeling Williams as must-run is appropriate because doing so "reflects real world conditions and constraints on the DESC system."[14] However, Witness Neely does not provide any basis for this statement, such as information or data about the DESC system that illustrates why this coal unit is considered a must-run facility. Like all generating units, the Williams coal unit experiences forced outages at unpredictable times, yet the DESC system continues to operate during such outages, which suggests that other generation can substitute for the Williams output.

My direct testimony cited indicators that DESC's coal units are relatively expensive generation sources. Witness Neely does not disagree with this characterization, but, oddly, states that *removing* the Williams must-run designation would reduce avoided costs. However, as I explain in my direct testimony, when expensive generation that would have been on the margin during some hours of the year is designated as must-run, it can no

[13] Rebuttal Testimony of James Neely at 13, Docket No. 2021-88-E (Aug. 10, 2021).
[14] *Id.*

longer be avoided in the production cost simulations, and as a consequence lower-cost generating units may actually be the avoidable generation on the margin in those hours. The result is that the must-run designation reduces avoided costs, not the other way around as claimed by Witness Neely. I recommend that DESC, if it continues to designate Williams as a must-run facility, be required to provide both qualitative and quantitative support for that decision, including any resulting impacts to avoided costs, in its 2023 avoided cost application.

II. AVOIDED CAPACITY RATES

a. Performance Adjustment Factor

Q. DO YOU AGREE WITH WITNESS NEELY'S REBUTTAL TESTIMONY CRITIQUING YOUR RECOMMENDATION TO INCLUDE A PERFORMANCE ADJUSTMENT FACTOR ("PAF")?

A. No. First, Witness Neely's statements about QF compensation relative to how much they generate do not address the fact that utility-owned generating units *are* fully compensated for capacity provisions to the system even if they do not generate during all hours of greatest capacity need.[15] As I explained in my direct testimony, utility-owned generators experience forced outages, including during hours of peak demand when capacity is most needed, yet the utility still receives full cost recovery for those assets. My recommendation to include a PAF in calculating avoided capacity costs puts QFs on equal footing with those utility-owned resources, as required by Act 62, by making a minor adjustment to avoided capacity costs that allows a comparable level of unavailability on

[15] *Id.* at 14:18-21, 15:1-8.

the part of the QF, while still receiving full capacity payment, just as DESC's assets receive.

Second, Witness Neely is asked a question that claims that my PAF recommendation penalizes DESC-owned generators.[16] To clarify, the PAF doesn't have any impact on DESC-owned generators, it simply adjusts the possible avoided capacity compensation for QFs so as to treat QFs equally with DESC's generators. Witness Neely also states that "[t]he avoided energy costs calculation is the appropriate place to address the forced outages of the Company's own resources."[17] I agree that utility resource forced outages should be included in the avoided energy costs calculation, but it also must be included in the avoided capacity cost calculation if QFs are to be given equal treatment to utility-owned generators. My PAF recommendation accomplishes that objective.

b. <u>Capital Cost Assumptions</u>

Q. PLEASE RESPOND TO WITNESS NEELY'S REBUTTAL STATEMENTS ABOUT AERO-CT CAPITAL COST ASSUMPTIONS.

A. Witness Neely states that "[t]he aero-CT costs used came from the interactions with turbine vendors" and that "to use a generic cost is not appropriate when actual cost data is available."[18] However, respected public data sources are a reliable and more transparent information source than non-public vendor statements. As noted in my direct testimony, this Commission has rejected cost assumptions based on vendor information in favor of credible public datasets supplying generic technology costs.

c. <u>Effective Load Carrying Capacity ("ELCC") Calculation</u>

[16] *Id.* at 15.
[17] *Id.* at 15.
[18] *Id.* at 16.

Q. PLEASE RESPOND TO WITNESS NEELY'S REBUTTAL STATEMENTS ABOUT DESC'S ELCC CALCULATIONS.

A. First, Witness Neely disagrees "that the Company has not provided sufficient information to evaluate the ELCC calculation."[19] As I recognize in my direct testimony, DESC did respond to discovery questions and provided more information than it initially provided about the ELCC calculations. Rather than having to request through lengthy discovery processes the details of calculations and analyses that are fundamentally important to the avoided cost rates being proposed, intervenors should have ready access to such details immediately as part of the utility's application. Further, as also noted in my direct testimony, even with the discovery responses on ELCC, a SAS program is not an accessibly reviewable response that transparently conveys the detailed methodology and intermediate outputs of the ELCC calculation. In other words, the full details of the ELCC calculation are still opaque to intervenors despite DESC's discovery responses.

Second, Witness Neely claims that "[a]n ELCC calculation need not be complicated in order to effectively calculate the capacity benefit that solar provides to the DESC system" in response to my concerns about the lack of rigor of DESC's ELCC calculation and a failure to incorporate current best practices in ELCC study design.[20] However, rigorous ELCC methodologies using modern analytical techniques and large datasets have been developed and used because they yield more accurate and reliable results. Any ELCC calculation that DESC performs for planning or ratemaking purposes should meet this standard. Further, Witness Neely's rebuttal response did not address my concerns that DESC's methodology failed to capture interactive effects such as diversity benefits.

[19] *Id.* at 17.
[20] *Id.* at 18.

Third, Witness Neely objects to my comparison of DESC's ELCC result to capacity accreditation values calculated by LBNL for several Florida municipal utilities, arguing that "Comparing DESC to these utilities is not an effective way to draw meaningful conclusions."[21] It is important to recognize that I did not recommend that DESC adopt any of the accreditation values from the LBNL study. I presented those study results as a reference point by which to judge the reasonableness of DESC's ELCC results. Of course there are differences between the Florida utilities and DESC; what is important here is that these are electric utilities serving considerable loads in the Southeastern region, and they are a valid benchmark for approximate capacity accreditation values we could expect to see for different penetration levels of solar. Given that a 5% accreditation is markedly different from a 15-30% accreditation in the LBNL study, it is reasonable to conclude that DESC's result "may be" undervaluing solar PV, especially in conjunction with the methodological concerns I detailed in my testimony.

d. <u>Seasonal Capacity Allocation</u>

Q. DO YOU AGREE WITH WITNESS NEELY'S REBUTTAL STATEMENTS ABOUT ASSIGNING ALL CAPACITY VALUE TO THE WINTER SEASON?

A. No. Contrary to Witness Neely's claim, DESC's response to SACE/CCL Data Request 2-10 does not substantiate allocation of 100% of capacity value to the winter season. First, the data provided simply show that, *looking only at the winter season*, the three hours between 6:00 AM and 9:00 AM tend to have the highest loads; the data shows nothing about how capacity should be allocated across different seasons. As such, DESC's

[21] *Id.* at 20.

response simply assumes that all capacity is allocated to the winter season, but does not justify DESC's decision to do so.

Second, despite the seasonal reserve margin differences and the level of existing solar on DESC's system, DESC's own calculations—which account for both the differing summer and winter reserve margins and the existing solar on the system—show that the DESC system has both a summer and a winter capacity need at the same time. Specifically, the expansion plan used by DESC to calculate avoided capacity costs shows the first year of avoidable capacity as 2028, when the Wateree and Williams coal plants are currently designated to retire, and in that year both the summer and winter reserve margins fall below the minimum levels unless new capacity is added to replace the retiring units.[22] This undercuts the validity of Witness Neely's statement that:

> "[w]ith a 21% winter reserve margin requirement and a 14% summer reserve margin requirement, plus available existing summer solar capacity, all of the need for additional capacity is driven by winter demand. Additional summer capacity does not avoid any future capacity costs and therefore avoided capacity credits are earned by resources that can help meet winter peaks."[23]

Further, as I described in my direct testimony, DESC's 100% winter season capacity allocation is at odds with the load patterns on its system. DESC has experienced more summer peaks than winter peaks in recent years, and the top 1% of load hours on the system include a very large number of hours during summer afternoons, in addition to the high-load hours during winter mornings. This is true even when accounting for existing solar.

[22] DESC Response to ORS AIR 1-4, "Change_ExPlan_AEROCT_66MW.xlsx."
[23] Rebuttal Testimony of James Neely at 20-21, Docket No. 2021-88-E (Aug. 10, 2021).

Witness Neely critiqued Figure 3 of my direct testimony, stating that it had more data points than it should have for the top 1% of hours for three historical years; he presented a corrected figure depicting three years of historical data. This discrepancy was due to an error; the label and description for Figure 3 should have stated that it includes five years of data rather than three. However, this change has no impact on my conclusion—both my Figure 3 and Witness Neely's three-year version demonstrate that DESC's system experiences large numbers of high-load hours during summer afternoons, even after accounting for the existing solar on the system.

Q. DO YOU CONTINUE TO RECOMMEND THAT THE TECHNOLOGY-NEUTRAL CAPACITY RATE BE ADJUSTED TO REFLECT SUMMER CAPACITY VALUE?

Yes. My proposed capacity rate approach is a reasonable alternative to DESC's proposal that reflects both the load patterns and the existing solar capacity on the system. My proposal in direct testimony uses a data-driven method for allocating capacity value between summer and winter seasons and for identifying the hours of greatest capacity need on the system. The result is a technology-neutral capacity rate whereby QFs would be paid based on when they generate. If they do not generate during winter morning hours, they will not be paid for those hours. In fact, a QF that never generates during any of the winter hours could only receive as high as 48% of the calculated avoided capacity value.

Q. DID YOU EVALUATE HOW A SOLAR QF WOULD BE EXPECTED TO BE COMPENSATED UNDER YOUR PROPOSED CAPACITY RATE APPROACH?

A. Yes. I tested an example solar production profile from DESC's territory and found that the example standalone solar facility would be expected to receive about 19% of the full avoided capacity value. That is because the example QF generates during the summer but still does not perfectly align with the summer peak hours, and thus receives much less than even the 48% value available to a QF that does not generate during the winter. Still, as I noted in my direct testimony, 19% of the full avoided capacity value is a modest increase in capacity value for standalone solar QFs compared to the 5% available from DESC's ELCC method. Compared to the LBNL study benchmark discussed above and in my direct testimony, 19% capacity compensation also seems much more reasonable. And again, under my proposal, solar QFs will only be paid if they actually generate during those hours where there is a capacity need.

Finally, I would like to reiterate that this Commission has previously approved an approach proposed by Duke Energy that uses the same basic construct as I am proposing here—whereby capacity value is allocated across seasons (not limited to winter) based on system data, and any technology is eligible for the rate. Under those previously approved rates, if standalone solar QFs only generate during summer hours, they receive only a partial capacity payment as appropriate for those hours, just as I am proposing here.[24]

III. TRANSPARENCY IN DESC'S APPLICATION AND TESTIMONY

Q. PLEASE RESPOND TO WITNESS KASSIS'S REBUTTAL TESTIMONY ON TRANSPARENCY.

[24] *See* Commission Order No. 2019-881(A) at 167-168, Docket Nos. 2019-185-E, 2019-186-E (Jan. 2, 2020), and DEC Schedule PP (SC) and DEP SC Schedule PP-5, Docket Nos. 2019-185-E, 2019-186-E (Jan. 17, 2020).

A. In response to my testimony regarding transparency, Witness Kassis lists DESC's timely responses to intervenor discovery questions.[25] My direct testimony acknowledges where DESC provided information through discovery, but primarily observes that the "underlying assumptions, data, and results" of DESC's proposed avoided cost rates should have been included in the initial filing, as specified by Act 62.[26] In other words, as the Commission explained in the 2019 avoided cost proceedings:

> Transparency, for purposes of these proceedings, is *a two-fold concept*. The willing and timely responses to requests for production is *one part of transparency*; further, the utility's report is to be reasonably transparent so that underlying assumptions, data, and results can be independently reviewed. Power Advisory reports that Dominion responded to all requests for production. However, *there was concern that the underlying assumptions, data, and results did not have documentation presented that would allow for accessible analysis*. While Dominion adequately responded to requests for production, as expected, I move that we instruct Dominion to present substantially more information about the underlying assumptions and data, such that the parties to such future proceedings may more meaningfully evaluate and analyze the methodologies and models employed by the utility.[27]

By focusing his response on discovery production, Witness Kassis ignores the other equally important aspect of transparency, which requires DESC to "present substantially more information about the underlying assumptions and data."

The purpose of that requirement is to facilitate "accessible analysis" of the underlying assumptions, data, and results, and to avoid numerous discovery requests that leave little time to prepare testimony. Witness Kassis does not address the implications of

[25] Rebuttal Testimony of Daniel Kassis at 16-17, Docket No. 2021-88-E (Aug. 10, 2021).
[26] S.C. Code Ann. § 58-41-20(J).
[27] Commission Directive dated Nov. 15, 2019, Docket No. 2019~~21~~-184~~88~~-E (rejecting DESC's motion to strike the independent consultant's report) (emphasis added).

intervenors being forced to expend valuable time and resources posing, waiting for, and reviewing discovery requests for basic information that constitutes critical elements of DESC's calculations and final proposals that should have been provided upfront as part of the application. Further, Witness Kassis does not address the fact that even with the Company's discovery responses key information either remains unclear or remains missing. My surrebuttal testimony above highlights two such examples—the lack of clarity around how energy pricing periods were designated, and the effectively missing methodological details and intermediate outputs of the ELCC calculation because it was provided solely in the form of a SAS program.

IV. CONCLUSIONS AND RECOMMENDATIONS

Q. PLEASE SUMMARIZE YOUR TESTIMONY CONCLUSIONS AND RECOMMENDATIONS.

A. As stated in my direct testimony, DESC's avoided cost rate proposals contain flawed assumptions and errors that prevent its avoided energy and capacity rates from fully and accurately reflecting avoided costs. In particular, the natural gas inputs, pricing period errors, eligibility restrictions, unreasonable inputs to the avoided capacity calculations, and flawed approaches to ELCC and capacity allocation prevent the rates from accurately reflecting DESC's avoided costs, as required by the EFA. The proposals also discriminate against small power producers by restricting standalone solar eligibility, omitting a PAF, and requiring availability during all capacity hours. Lastly, DESC's filings fall short of the transparency requirements set out in the EFA and the Commission's 2019 directive.

To remedy these issues, I recommend that the Commission require DESC to make the following changes to its avoided energy rates:

- Re-run the PLEXOS modeling with reasonable gas price assumptions based on the blended approach I recommend, which uses the EIA AEO reference case *directly* for avoided cost calculations and not only for the escalation rate.
- Ensure the accuracy and objectivity of DESC's pricing periods by correcting the methodology used to develop the heat map and adopting my recommended data-driven approach to grouping hours and months into pricing periods based on the colors in the heat map. In addition, because I recommend re-running the PLEXOS modeling with reasonable gas price assumptions, I further recommend that the revised system marginal price data be used to develop the corrected energy pricing periods.
- Permit standalone solar QFs to be eligible for the Standard Offer technology neutral energy rate. If the Commission approves a variable integration charge for new standalone solar QFs, that charge can be applied to those QFs within the Standard Offer technology neutral energy rate, as in current DESC and Duke Energy avoided cost tariffs.
- Require DESC, if it continues to designate Williams as a must-run facility, to provide both qualitative and quantitative support for that decision, including any resulting impacts to avoided costs, in its 2023 avoided cost application.

I further recommend that the Commission require DESC to make the following changes to its avoided capacity rates:

- Apply a Performance Adjustment Factor to the final $/kW-year capital cost value used to develop the avoided capacity rates, in order to put QFs on equal footing with utility-owned resources.

- Use EIA data points for the aero-CT capital cost and fixed O&M in the avoided capacity cost calculations.
- Include in future avoided cost applications the detailed methodology and intermediate outputs of the DESC's ELCC calculation in a format that may be reviewed by intervenors. I further recommend that DESC be required to use large datasets and rigorous ELCC methodologies using modern analytical techniques, including those that capture interactive effects such as diversity benefits, when performing future ELCC calculations.
- Improve the accuracy of the technology neutral capacity rate by using the data-driven method summarized above for allocating capacity value between summer and winter seasons and for identifying the hours of greatest capacity need on the system. For the 2021 technology neutral capacity rate, I recommend using the specific rates presented in my direct testimony.[28]
- Permit standalone solar QFs to be eligible for the Standard Offer technology neutral capacity rate.
- Remove the requirement that QFs be available and dispatchable in *all* capacity payment hours to receive *any* capacity payment.

Finally, I recommend that DESC be required to include in future avoided cost filings its "underlying assumptions, data, and results," including but not limited to the basis of any decision to designate Williams as must-run, its major production cost model inputs, further details of its pricing period development and ELCC calculation, and the basis of its seasonal capacity allocation and hours for capacity payments.

[28] Direct Testimony of Kenneth Sercy at 30 Table 1, Docket No. 2021-88-E (Aug. 27, 2021).

Q. DOES THIS CONCLUDE YOUR CORRECTED SURREBUTTAL TESTIMONY?

A. Yes.